Frameshift for the Framework

Understanding and Using the Vision from the Framework for K-12 Science Education to Improve Science Teaching and Learning

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Our Exploration this Morning

- **What** – Increase our capacity to support one another in our transition to K-12 Science Education Framework aligned instructional practices.
- **Why** – K-12 Science Education Framework is here and is built on the latest understanding about teaching and learning.
- **How** – By considering some instructional frames and by thinking about the Practices identified in the K-12 Science Education Framework.

Let's Begin By Making Sense of Some Data

- **The data is in the form of a vignette; a short written example of a classroom lesson.**
- **You will read two vignettes.**

Vignette Instructions

- **While you read, keep in mind these three questions:**
  - **What are the students doing?**
  - **What are the students learning?**
  - **How is science portrayed to students in this vignette? (i.e. science is …).**

Partner Dialogue

- **Turn to someone next to you and discuss your answers. Make sure to discuss both vignettes.**
  - **What are the students doing?**
  - **What are the students learning?**
  - **How is science portrayed to students in this vignette? (i.e. science is …).**

Share some of your thinking

- Please volunteer something from the dialogue you had about the vignettes?

- Consider the following labels:
  - **Sense-making frame** for instruction
  - **Information frame** for instruction

Frames for Science Instruction

Information frame

Vignette 1

- This lesson is centered in an information frame for instruction.
- Students are focused on knowing information.
- Science is portrayed as a body of established facts.

Sense-making frame

Vignette 2

- This lesson is centered in a sense-making frame for instruction.
- Students are focused on understanding something.
- Science is portrayed as a way to make sense of something.

So what is science?

- From *A Framework for K-12 Science Education* (2011):

  "Science is not just a body of knowledge that reflects current understanding of the world; it is also a set of practices used to establish, extend, and refine that knowledge. Both elements – knowledge and practice – are essential."

- Science is both a body of knowledge and set of practices focused on understanding the natural world.

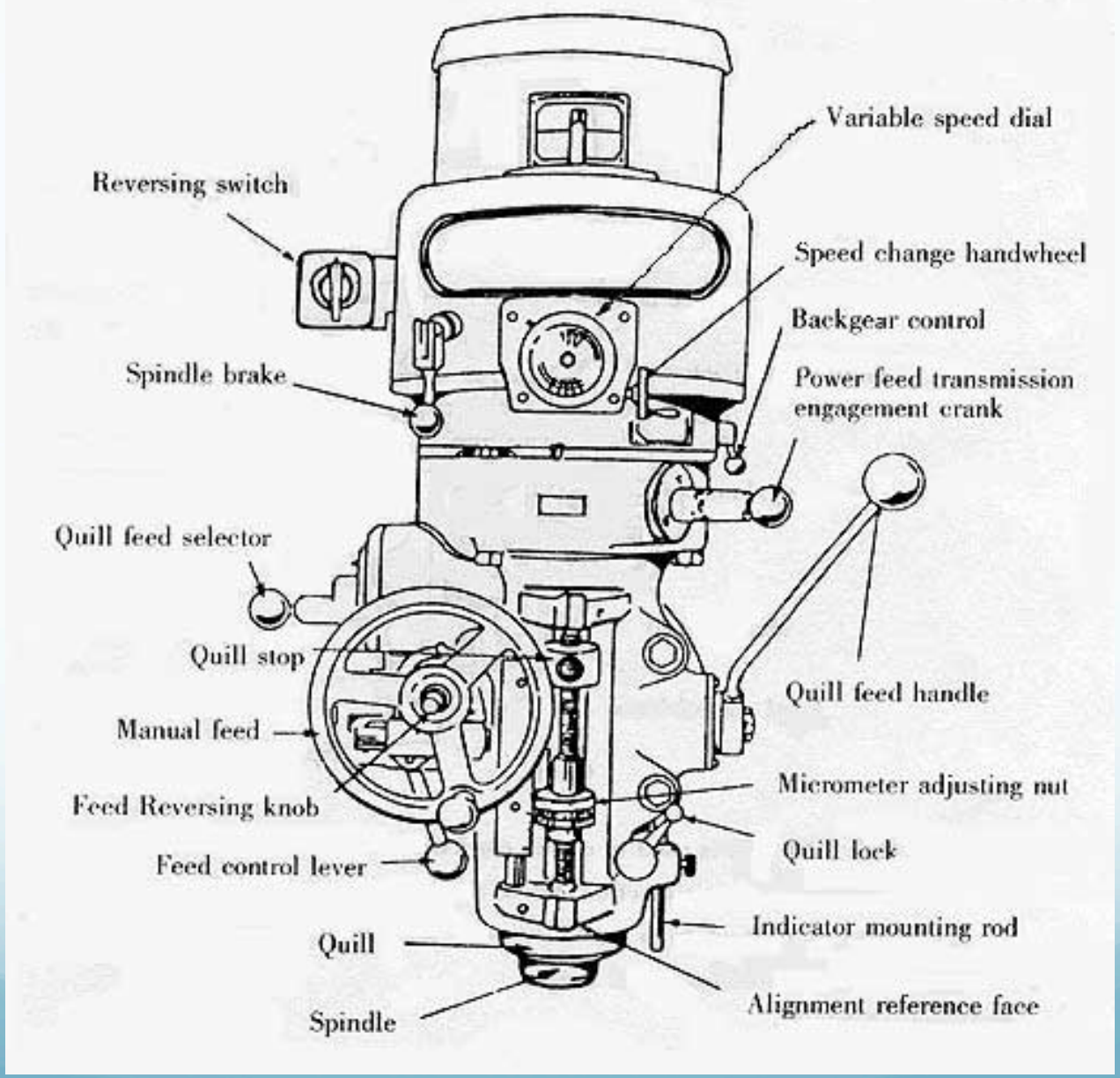
Science as Sense-making

- Science is fundamentally about making sense of the natural world.
- We often use the language: "*figure something out*".
- When you are tying *to figure something out*, you are trying to make sense of it. You are engaged in the process of sense-making.

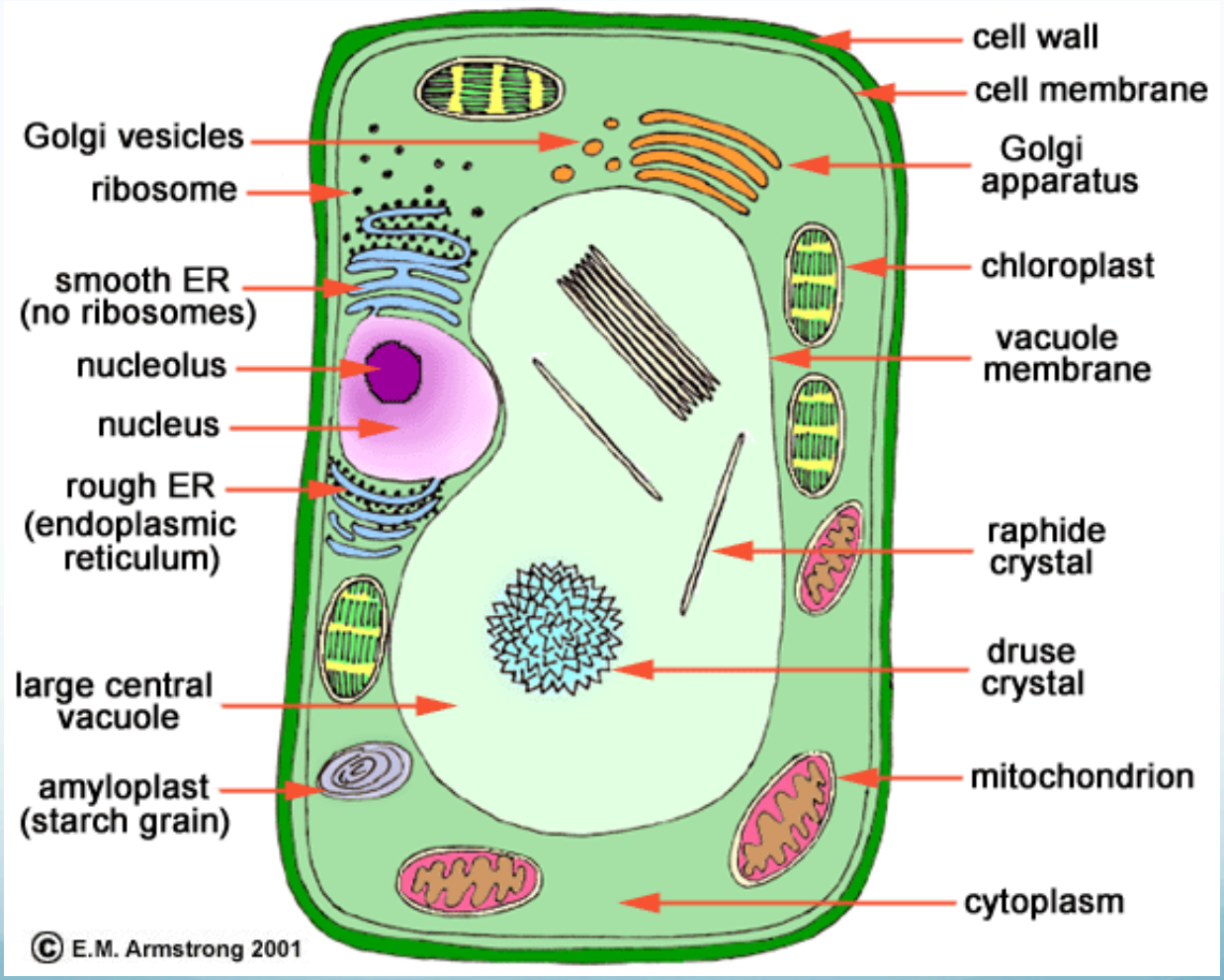
Information Versus Sense-making

- So, both an information frame for instruction and a sense-making frame for instruction represent aspects of science and are important.
- Let's be clear:
  - We want students to know stuff.
  - And we also want students to make sense of stuff.
- An interesting thing is, you need to **know** some stuff in order to **make sense** of other stuff.
- But the converse is not true, because **you can know stuff without making sense of it**.

- We can memorize and “know” all the words here, without having any understanding of what this is:



- Just as we can memorize and “know” all the words here, without having deep understanding of what this is or how it functions:



Shifting along the Information/ Sense-Making Continuum

- While both frames for instruction are important, research and experience show us that most teachers are very good at the **information** frame for instruction.
- What most teachers need support with is the **sense-making** frame for instruction.
- **Sense-making is the shift to reach for.**

The the K-12 Science Education Framework provides a map for sense-making

- That map is found in the three aspects –
  - Disciplinary Core Ideas
  - Science and Engineering Practices
  - Cross Cutting Concepts

K-12 Science Education Framework (2011) Scientific and Engineering Practices

1. Asking questions (science)and defining problems (engineering)
2. Developing and using models
3. Carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking.
6. Constructing explanations (science) designing solutions (engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating and communicating information.

Recognizing the Practices in Instruction

- Re-read Vignette 2 –
  - Keep the **Practices** in mind and circle and label segments of Vignette 2 where the Practices play out.
- Once you have completed your analysis have a table dialogue to share your thinking.

K-12 Science Education Framework (2011) Scientific and Engineering Practices

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

- **The practices are highly interconnected.**
- **The practices are not meant to be learned separate from the science.**

THANK YOU

Have a great day.

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